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New Urban Transportation Policies in Serbia as a Factor of Sustainable Development

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Priority of urban transport management can be separated on four special areas:

1. **Improvements parking management**
2. **Renewal and reconstruction of public transport**
3. **Increase of security for pedestrians and cyclists**
4. **Reduction in the use of energy, air pollution and level of noise**

Since these four subjects have been discussed separately, it should be emphasized that they are quite connected and should be united in a unique transport policy.

5. Improvements parking management

Many towns in Serbia already started to improve Handling Parking in central town areas. In the future period, the parking policy for the territory of the whole town should be defined and thus produced solutions and balanced consequences of the limited movement of cars in the central areas of towns.

The key questions for town authorities on the parking handling are:

- **More effective penal policy**
  Better control and more efficient penal policy should refer to the current and the future handling of street and off-street parking. The following measures should be applied:
  - increase the number of people who will do the control
  - allow access to certain areas only through the payments/tickets

  In order to improve penal policy for handling traffic, it its important not to create the atmosphere of “police state”. More effective parking penal policy will also give priority to the needs and wants of pedestrians, inhabitants, cyclists and it will increase their safety in traffic.

- **Controlling street and off-street parking**

  Controlling street and off-street parking is of a special importance in view of dilemmas about the number of parking spaces. There is no specified number of parking spaces, which could depend on the territory of a town.

  However, current-parking plans may require certain adjustments to the needs of different towns. Such adjustments are:
  - fine coordination of the existing parking plan and new findings and aims in order to meet with local needs and wants
  - paying more attention to non-residential parking (i.e. parking by business buildings), to the number of anticipated parking spaces when constructing new business premises, to introduce standards fro limited number of parking spaces.

- **Rationalization of the decision process**
  For the successful development of further parking policy, the town needs to include all relevant subjects. For the long-term parking strategies to be successful, it is needed to:
    - form partnership of town authorities, representatives of business associations and citizens;
    - use the temporary universal research, such as the capacity of the traffic arteries, disposability of public transport, the existence of free space, number of current parking places and the assessment of the newly generated traffic by a carefully planned construction;
    - design a model which would simulate traffic and which would be based on the available data; design these models for the city centre and for all other areas of cities/towns in order to have a better look on the requirements for parking places.

  Such effects, with all their advantages and flaws, rationalized and envisaged, make space for decisions and participation of everyone who can contribute to the broad application of parking policy.

- **Operational organization**
  On the organizational level, town authorities can make a contract with a company, which would deal with traffic handling, or they could handle traffic on their own. The town authorities could, in the first place, focus on setting up policies, forming frames for implementing parking policy, etc., than on handling everyday organizational and operational problems.

  It is necessary to invite tenders for parking handling and thus find a company, which would offer a higher level in efficiency in parking handling. It is also necessary to monitor the incomes regularly and define for which purposes this money is going to be spent (e.g. on public transport and/or other measures that would provide reduced use of cars).

  The condition in which the parking system currently is, dictates the realization of activities, which should result in the following:

  a) Consistent application of provisions and regulations that define the required number of parking spaces for the objects of specified purpose. These regulations should be considered and put into effect during the planning phase and when preparing technical documentation for the construction.
  b) Spatial organization of the present state: technical organization of parking spaces in the streets with insignificant construction sights and within the valid street width. This should be done with regard to regulations about the choice of the micro location and dimension of parking spaces.
  c) Functional organization of the present state which means definition and more efficient application of the parking regime, parking space market, tariff system, system of control and sanctioning parking violations.
    - The parking regime implies the regime of regulating parking periods with the use of tickets.
    - Parking space market: all parking spaces in the areas of great interest should be charged.
    - Tariff system: when forming the tariff system, all categories of users, especially residents, should be taken into account.

- The system of control and sanctioning parking violations: this system should define types of violations, ways of defining them, ticket amounts and ways of sanctioning them.

d) Constructing off-street car parks and parking garages in the central area of towns, for public use and residents.

e) Integrate the parking tariff system and the public transport tariff system in favor of public transport.

f) Introduce parking regime with limited parking periods in areas of the highest interest.

g) Introduce unique tariff system for the areas closest to the centre of town, which would stimulate only short-term parking in the streets.

h) Effective implementation of the system of controlling and sanctioning parking violations.

The next step would involve construction of parking garages and off-street car parks for the residents, employed people and visitors in the marginal areas of the town centre. These car parks would be constructed on the principle "Park and Ride", which gives positive results only if the whole complex of parking handling measures are implemented in areas of greatest interest. This system should be implemented in the marginal parts of central areas as well.

"Park and ride" locations should be placed along the terminals, terminus and public transport stops with large circulation of passengers and on the public transport and suburban transport routes with large capacities.

5. Renewal and reconstruction of public transport

When we speak about public transport, attention should be paid to the following aspects:

- **Technical aspect**

Renewal and reconstruction of public transport

Renewal of the car pool, mostly buses, is the main requirement and request of a public transport corporation. Of course, the renewal of old buses (e.g. installing new engines) must be carefully assessed depending on the operational age of that vehicle. On the other hand, buying new buses can be a better solution in case of maintaining costs being smaller in that way, or the degree of air pollution and noise emission by newer buses is smaller.

For the transitional period, it turns out that it is much better to modernize and use used vehicles when trams are concerned, because their operational age is three times linger than with buses. In such a case, the question of whether the renewal of trams is necessary should also be asked. The advantages of this strategy are the following:

- It is possible to mend the trams in the country, which is from the financial point of view more acceptable;
- Chose the vehicles from the existing car pool whose repair would improve their technical condition much more;

- Supply of used trams could replace the process of mending the existing ones;
- New rams should be bought through the mid-term and long-term programs of car pool renewals.

These measures should be combined with gradual renewal of tram rails and thus provided more comfortable transport by trams. Also, renewal and maintenance of a car pool are a good marketing move for the new and positive image of the public transport corporation.

Giving priority to public transport

In order to improve the condition of traffic infrastructure, most towns urgently need certain engineer measures. Those, quite simple measures, are:

- Renewal of tram rails;
- Introducing new bus routes and making the existing routes longer;
- Separating tram rails and bus lanes from the rest of the traffic wherever it is possible;
- Giving priority to public transport vehicles at crossroads. It could be possible even at the crossroads where public transport vehicles have separate lanes and at the cross roads where there are at least two lanes for one direction. The green phase for public transport vehicles is precisely determined and just quite long enough fro these vehicles to pass the crossroads.

All the above-mentioned measures contribute to the cheaper, more comfortable and more attractive public transport.

- **Operational aspect**

The first step would be the transformation of out-of-date public transport corporations into town corporations which would be more capable of handling both economy and efficiency aspects. Such corporations would be a transitional phase until the complete commercialization is reached.

Denationalization is not a priority, but it should lead to that in a longer corporation transformation process. At this moment, it is important to obtain responsibility, transparency, executive and tax control, which would reduce deficits in corporations, increase incomes, result in cooperation with municipality, and find balance between the increased bus tickets and economy needs.

Redesigning the network of public transport routes

One of the key elements in improving public transport quality is redesigning the network of public transport routes. Naturally, redesigning the network of bus routes is much easier than redesigning tram or trolleybus routes. On the other hand, handling public transport system would be easier if the network of public transport routes would be optimized, as well as the timetables, if the volume of car pools would be reduced and if the existing car pools would be used more efficiently.

On the other hand, this process would lead to other positive measures for the users:

- Frequent services during the rush hour and apart from it;
- Better accessibility to public transport stops, as well as better accessibility to the vehicle itself by introducing low-floor vehicles;
- Punctuality and safety when priority signaling system is concerned;
- Reasonable amount of the tickets;

- Maintain the attractiveness and comfort of public transport by introducing contemporary vehicles;
- Integrated tariff system;
- Modes interchanges'';
- Better communication with the users through contemporary ITs.

Foreign experience

In countries of the Central and Eastern Europe, foreign experience has proved to be very significant when changing organizational and operational structure. Apart from the collaboration of engineers, other types of cooperation have been employed. These are joint ventures, partnerships with public transport corporations or public transport associations from Western European countries, cooperation concerning requests from international financial institutions, cooperation with NGOs as consultants which would initiate the support of towns in public transport domain.

- **Public transport investments**

  Those who bring decisions in municipalities should create clear strategy of the direction of the future public traffic development. Such a context asks for following questions:

  - Is it better to handle public traffic through a real commercial company or is it better to keep it within a public corporation?
  - Does the process of transformation require certain phases or should it be done all at once?

5. Increase of security for pedestrians and cyclists

Municipal authorities should pay more attention to pedestrians, because they take up quite a large percentage in the modal split. Furthermore, pedestrians are the main users of public transport. It is estimated that between 60% and 75% of all travels by public transport is combined with walking. But in spite of that, not much has been done about improving the safety of pedestrians.

In order to increase the safety of pedestrians in towns, municipalities should undertake following measures to reduce suffering of pedestrians:

- Identify "black points" and immediately answer to the large number of accidents involving pedestrians;
- Give priority to the suffering of pedestrians, make it a part of political agenda and reconsider strategies for decreasing the degree of the suffering of pedestrians
- Categorize streets clearly according to their use and type of traffic;
- Make an estimate of the flow and volume of traffic in the streets;
- Make the estimate of pedestrians and cyclists' mobility;
- Adopt a program based on this research and identify areas which would be limited to motor traffic in mid-term and long-term programs;
- Organize campaigns for building up the awareness of drivers about the needs and requests of non-motorized traffic participants.

Based on the research and reports about the accidents involving pedestrians, the working version of pedestrian traffic plan should be presented to municipality members, representatives of economy, ecology groups and citizens in order to reach the decision about the town areas which need immediate action and to make the list of priorities.

Although pedestrian mobility is in focus here, measures for cyclists should also be implemented by securing suitable and safe bicycle lanes.

Securing safe pedestrian and cyclist zones is possible by forming car-free areas in town centers or in streets available only for public transport vehicles. Naturally, it is possible to undertake some of the following measures:

- Shorter waiting period at traffic lights and longer green light for pedestrians;
- Designing pedestrian and cyclist lanes, such as cyclist lanes from home to schools;
- Better control and penalty measures, or better monitoring of traffic violations (e.g. speeding, parking on the pavements, etc.);
- Expert training of municipality staff responsible for traffic policy.

Giving priority to the needs and requests of pedestrians is only the first step in the political agenda, but a crucial one. Having in mind that finances can cause problems, the measures for increasing security should be combined with:

- The construction of new streets and reconstruction of the old ones;
- The decrease in the volume of traffic in the whole town and improving traffic handling in areas relying on the town center;
- The measures rehabilitating urban areas, such as redesigning town squares and making streets into residential areas.

4. Sustainable urban transport - reduction in the use of energy, air pollution and level of noise

Only the combination of parking handling, improvement of public transport and increase of security of non-motorized traffic participants, can lead to sustainable mobility in towns. What should be added to all this are measures for the reduction of energy use, air pollution and level of noise:

- By using contemporary technologies in handling and managing traffic, towns could reach up to 30% of energy saving;
- Improving and renewing traffic infrastructure;
- Modernize fleet and introduce contemporary vehicles which would influence energy savings up to 30%;
- Stimulate population to use public transport;
- Find new ways of ensuring financing of traffic in towns, by a significant raise in funds from the budget (i.e. provide suburban municipalities with larger funds). These financial means must, in the first place, be aimed at improving public transport and traffic handling system;
- Change certain regulations and urban practice, allow faster construction and building of parking spaces, garages, etc;
- Free the vehicle import from high customs rates and taxes, and aggravate the restrictive policy of the insurance of old vehicles;
- Aiming at the reduction of ecological risks, it is necessary to support by law the organized process of recycling waste materials and unusable cars, which is a common thing now in the European Union.

5. Necessary institutions, policies, motives, instruments and measures

Institutions

To ensure the development of traffic, the following institutions will be needed, which do not exist now (*Strategy of economy development in Serbia up to 2010*):

At the state level

- The agency for implementation of the adopted strategies of traffic development, which would coordinate the activities of state institutions and transport corporations of all types, would ensure the legal and fiscal support;
- Transport services market;
- Quality center;
- Laboratory for measuring devices in vehicles, fuel of a good quality, good condition of traffic arteries, etc.) which would finance itself;
- Agency for managing maintenance of traffic arteries and equipment;
- Advice for traffic security;
- Agency for developing IT–technologies in the traffic area.

In towns (depending on the territory)

- Traffic ministry (they exist only in Belgrade and Novi Sad);
- Board for handling public transport (exists only in Belgrade);
- Board for handling traffic in towns;
- Board for handling sustainable transport;
- Parking corporations (exist only in Belgrade);
- Informational centers for traffic participants;
- Centre – data base of traffic information in local self-governments;

Policies

- Harmonize law regulations to the EU, because otherwise Serbia would drastically diminish its likelihood to communicate with other countries;
- Stimulating policy of renewing infrastructure and transport means, which would lead to more energy efficient, more secure and ecological-friendly transport;
- The policy of transport costs; tax policy should discourage the acquirement and use of technologically old transport means;
- Stimulating policy of introducing private transport corporations and public-private partnership (PPP);
- Ensure larger financial means through the budget for local self-governments;
- Use the income from retail prices of fuel and road taxes for improving traffic arteries and public transport, not only infrastructure, as it was the case up to now;
- Use the income from traffic violation fines for improving security in traffic.

Motives, instruments and measures

- There is a growing number of traffic accidents in Serbia, whereas in the EU the situation is the opposite in the last few years;
- Monitoring transport policy in the EU which is characterized by a correlation of different networks (interconnectibility), correlation of different modalities (intermodality) and correlation of different services (interoperability);
- Stimulate renewal and destimulate the use of out-of-date transport means which are unsafe, energetically inefficient and ecologically unsuitable;
- Law regulation for towns to design and implement *Master Transport Plan* and innovate it every 7 years;
- Protection of the environment.

6. Survey of main attributes of selected policy measures

Measure	Main effect	Spatial level	Total time for effect	Main targets
Technological measures				
Electric vehicles	Reduce emission at source	Urban	25 years +	2nd and 3rd cars in family, for inter-urban trips
Change of fuels in buses	Reduce emission at source	Mainly urban	Approximately 5 years	Interurban bus lines
Improved private vehicle technology	Reduce emission at source	National	5-15 years (depending on availability on world market)	New car buyers
Improved car maintenance	Reduce emission at source	National	1-2 years	Owners of old cars
Improved infrastructure: • quite pavement • porous pavement • improved rail	 Reduce noise Reduce runoff Reduce noise and improve performance	 Mainly urban Urban or interurban National	 5-10 years 5 years + 5 years +	Roads near residential areas Water sensitive areas
Traffic management				
Traffic calming	Reduce through traffic and improve safety in residential areas	Urban	Within 5 years	Residential areas
Coordination of public transport services	Increase public transport attractiveness	National and/or metropolitan	5-10 years	Potential public transport users
Park and ride	Increase public transport attractiveness	metropolitan	Within 5 years	Commuters on radial routes
Parking adjusted to public transport supply	Increase attractiveness of public transport	Mainly central cities	Approximately 5 years	Commuters to central business district
Coordination of traffic lights	Reduce "stop and go" traffic	Urban	Within 5 years	Drivers on main thoroughfares
Closure of city center to private vehicle	Reduce emission and increase public transport's attractiveness	Urban (city center)	5-10 years	Employees and visitors in city centers
Pedestrianization schemes	Encourage non-motorized transport	Urban (city center)	5-10 years	Businesses, costumers and visitors to city
Truck routes	Reduce exposure (mainly noise and particulates)	Metropolitan	Within 5 years	Heavy tracks(above 4 t)

Demand management				
Raise of gasoline taxes	Reduce vehicle-km	National	Immediate	All car users
Road pricing	Reduce congestion	Metropolitan	10-15 years	Car users
Vehicle taxes	Slow rate in motorization rate	National	Immediate (within a year)	Current and potential car owners
Pollution taxes	Disincentive for use of high-pollution modes and vehicles	National (possibly metropolitan)	10-15 years	Current and potential car users, particularly older cars
Differential parking fees	Reduce car use to city centers	Urban or metropolitan	Immediate (within a year)	Commuters to city centers
Car and van pooling	Reduce vehicle trips	Urban or metropolitan	Within 2 years	Commuters to large employment centers
Tax of company vehicles	Reduce vehicle trips and vehicle-km driven	National	Within 2 years	Company car users
Administrative controls on vehicle ownership or use	Reduce vehicle trips	National or metropolitan	Within 2 years	Depends on specifics of limitation
Information	Improve vehicle flows and thus lower emissions	Metropolitan	Within 2 years	Mainly commuters
Infrastructure and land-use planning				
Control of urban form	Increase attractiveness of public transport and non-motorized transport, reduce vehicle-km	Metropolitan	20 + years	All segments of the metropolitan population and businesses
Increase mixed users	Support non-motorized travel, reduce vehicle-km	Urban or metropolitan	10-20 years	Urban population
Cycling paths	Encourage cycling	Urban	Within 5 years	Short-range travelers
Bus lines	Change modal split in favor of public transport	Urban or metropolitan	Within 5 years	Mainly on radial lines
Light rail	Change modal split in favor of public transport	Urban or metropolitan (inner rings)	5-15 years	Commuters to central business district
Metro	Change modal split in favor of public transport	Metropolitan core	15 + years	Commuters within metropolitan area
Suburban rail	Change modal split in favor of public transport	Metropolitan	1-5 years	Commuters to the central city
Noise-sensitive planning	Reduce noise exposure	Urban	5-10 years	Residential areas near main routes
Lower standards for roads and parking	Reduce loss of open space and visual amenities	Urban (parking) and interurban (road standards)	10 + years	Areas with inadequate open spaces and highly visible areas
Coordination of densities parking and public transport	Change modal split in favor of public transport	Metropolitan	20 + years	Commuters to central city and businesses

A spatially and temporally differentiated framework

Spatial level	Within a year or two	Between 1 and 5 years	Between 5 and 15 years	Over 15 years
Urban areas	Parking fees, car and bus pooling; improved information system	Shift of buses to alternative fuel; traffic calming; cycling paths; reduced parking standards Truck routes; suburban rail; bus lines; coordination of parking and public transport policies	Quiet pavements; closure of city centers to cars and pedestrian schemes; noise sensitive planning; increase in mixed uses, coordination of public transport systems; light rail	Electric cars, change in urban form; coordination of densities and public transport supply; metro
National level	Gasoline taxes; company cars tax; emission testing	Emission-based limitations on car imports	Better vehicle technologies; pollution taxes; lower standards for sensitive interurban roads; improved interurban rail	Introduction of new fuels to private cars